Helping OCSPP / EFED Design Spatially-Explicit Risk Assessments for Wildlife Populations

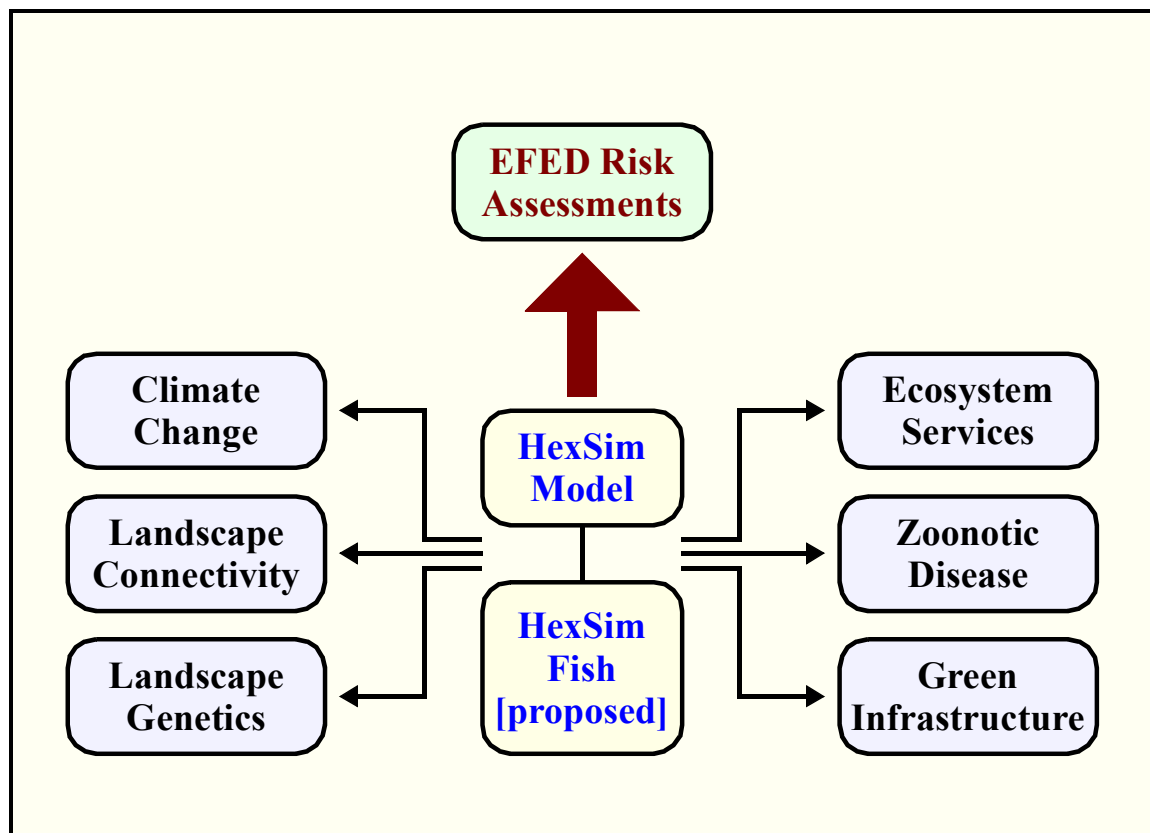|	
Author	**Nathan Schumaker (NHEERL/WED)**
MYP	**Chemical Safety for Stainability (CSS)**
Project staff	**NHEERL** **NERL** **Office of the Science Advisor** **OCSPP / EFED**

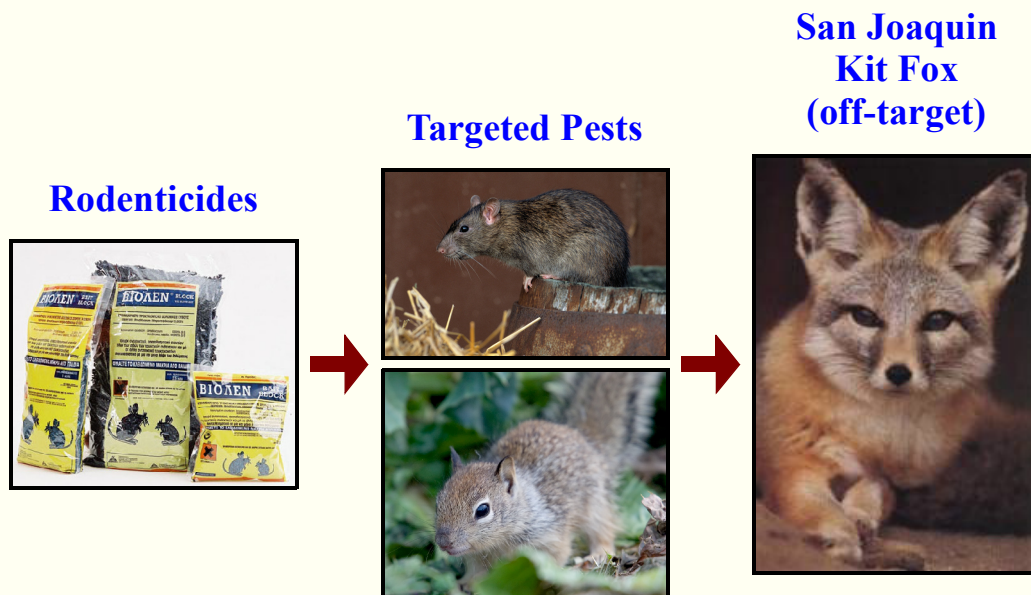|	
Agency Need	**EFED needs the capability to do spatially and temporally explicit, population-level probabilistic risk assessments for pesticides, in combination with exposure to other stressors.**
Research Approach	**WED recently completed a modeling platform (HexSim) that was designed specifically to address this need. We will demonstrate the utility to of this approach to EFED using case studies.**

Primary Research Team (proposed)

Nathan Schumaker
Allen Brookes
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Mark Bagley

Eric Waits
Tom Purucker   (NERL)
David Bradford

Cooperators & Collaborators

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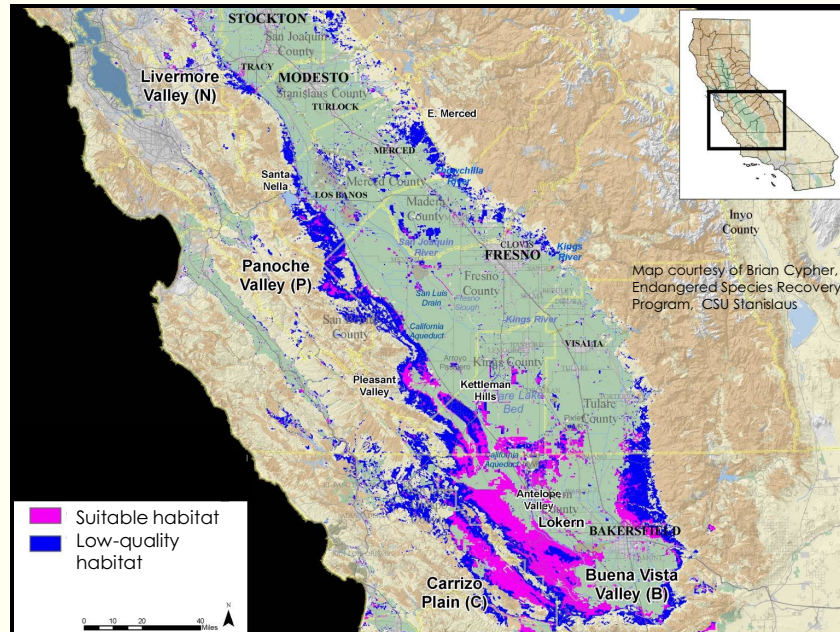William Eckle
Brian Anderson

Some PATCH / HexSim Applications

- **Alternative Futures Analysis**
- **Ecosystem Services**
- **Northern spotted owl recovery planning**
- **Ord's kangaroo rat (Canada)**
- **Marten & fisher reintroduction studies**
- **Desert tortoise**
- **Black-capped vireo**
- **Red-cockaded woodpecker**
- **Wolf recovery planning (US / Canada)**
- **Large carnivore conservation**
- **Landscape connectivity research**
- **Landscape genetics research**
- **Disease ecology research**

San Joaquin Kit Fox Case Study

Rodenticides

Targeted Pests

San Joaquin Kit Fox (off-target)

The San Joaquin Kit Fox is Federally Listed, and the Subject of an Ongoing Study at EFED.

Other Possible Case Studies

Prairie Dog Bait: black footed ferret, grizzly bear, northern aplomado falcon, canada lynx, mexican spotted owl, gray wolf, golden-cheek warbler, etc.

Atrazine, etc: California red-legged frog, and other species.

Other Pesticides: salt marsh harvest mouse, California tiger salamander, San Francisco garter snake, Bay checkerspot butterfly, etc.
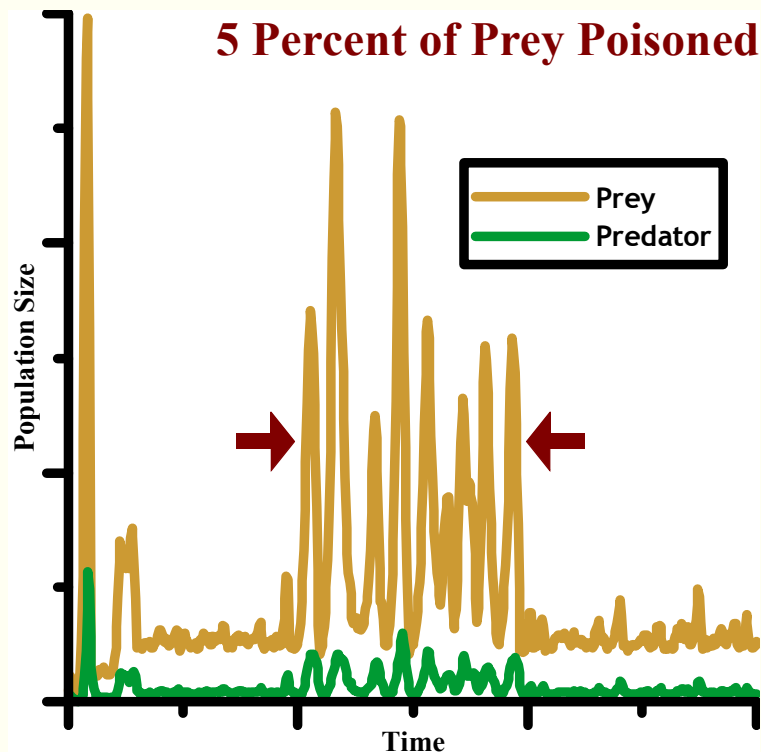
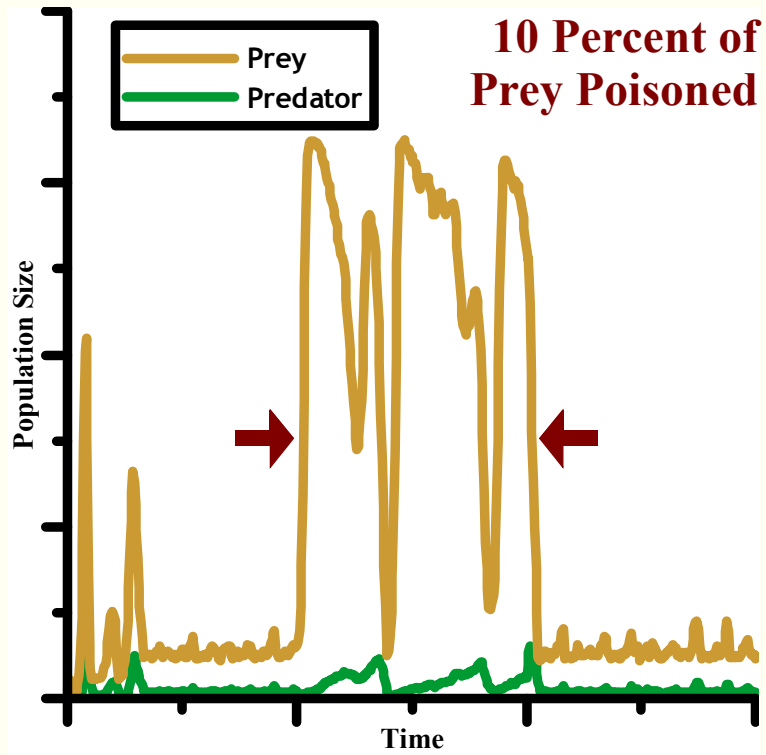# A Hypothetical Illustration

- **Predator-Prey System**

- **Predators chase and consume prey**

- **Fabricated landscape includes prey refuges**

- **Prey survival and reproduction vary with resource acquisition from habitat map**

- **Predator survival and reproduction vary with the number of prey items captured**

- **A "rodenticide" is added that kills prey, but also kills predators who eat poisoned prey**
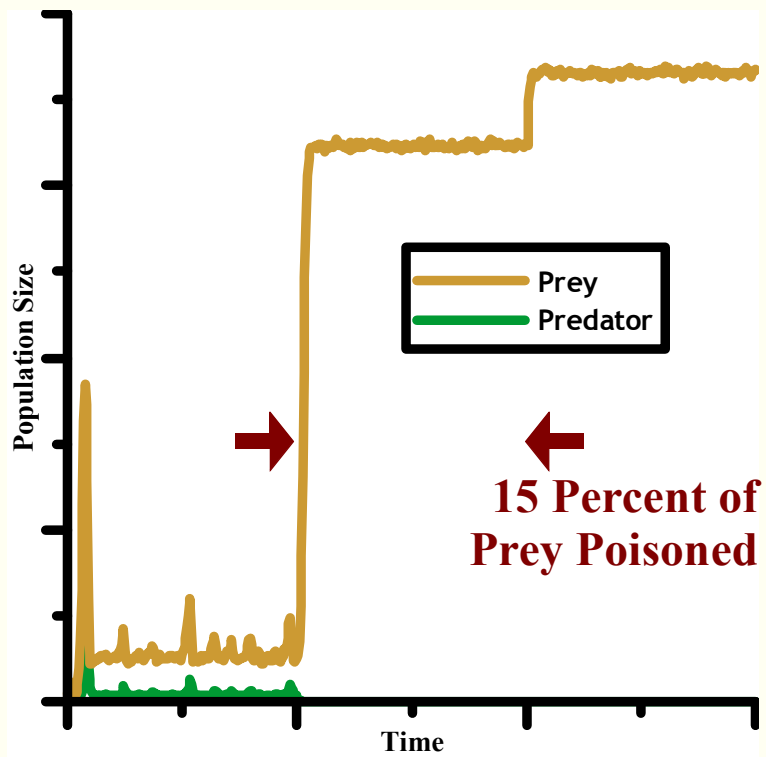
- **Predators only capture live prey items**

5 Percent of Prey Poisoned

10 Percent of Prey Poisoned

15 Percent of Prey Poisoned